



## ***Platycleis galvagnii*, a peculiar new bushcricket from Sardinia (Italy) (Insecta, Orthoptera, Tettigoniidae)**

PAOLO FONTANA<sup>1</sup>, FILIPPO M. BUZZETTI<sup>2</sup>, ROY M.J.C. KLEUKERS<sup>3</sup> & BAUDEWIJN ODÉ<sup>4</sup>

<sup>1</sup>Fondazione Edmund Mach - Istituto Agrario di San Michele all'Adige. Centro Trasferimento Tecnologico - Fitoiatria. Via Mach, 1 - 38010 San Michele all'Adige, Trento. Italy. E-mail: paolo\_api.fontana@iasma.it

<sup>2</sup>Via Trento, 59D I-36071 Arzignano (Vicenza), Italy. E-mail: buzzjazz@hotmail.com

<sup>3</sup>European Invertebrate Survey - The Netherlands / Netherlands Centre for Biodiversity Naturalis, Postbus 9517, 2300 RA Leiden, The Netherlands. E-mail: roy.kleukers@ncbnaturalis.nl

<sup>4</sup>P.C. Hoofstraat 149, 1071 BT Amsterdam, The Netherlands. E-mail: baudewijn.ode@hetnet.nl

### **Abstract**

*Platycleis galvagnii* **n. sp.** from Sardinia (Italy) is described. In general habitus the new taxon is close to *Platycleis* sensu strictu, albeit very small in size. When looking at other characters the species does not seem to fit within one of the groups recognised within *Platycleis* s.l., but for the moment the species is placed in *Platycleis* s.s.. The species is characterised by a range of morphological and bioacoustic characters. Its real affiliations with other species within the *Platycleis* complex need to be established further. For the moment the species is known only from the type locality, Gennargentu mountain in the central part of Sardinia.

**Key words:** *Platycleis galvagnii* **n. sp.**, bioacoustics, Gennargentu, Sardinia, Italia

### **Introduction**

The Orthoptera fauna of Sardinia is relatively well studied (A. Costa 1882, 1883, 1884, 1885, 1886, Nadig & Nadig 1934, Galvagni 1976, 1978, 1990, Galvagni & Massa 1980, Galvagni *et al.* 2007, Ingrisch 1983, Schmidt & Hermann 2000, Massa 2010). In total eight taxa within the genus *Platycleis* s.l. are mentioned from Sardinia: *P. (Platycleis) falx laticauda* Brunner, 1882, *P. (Platycleis) grisea grisea* (Fabricius, 1781), *P. (Platycleis) intermedia intermedia* (Serville, 1839), *P. (Platycleis) intermedia umbilicata* (A. Costa, 1855), *P. (Platycleis) sabulosa* Azam, 1901, *P. (Tessellana) tessellata* (Charpentier, 1825) and *P. (Montana) stricta* (Zeller, 1849).

During orthopterological field expeditions in Sardinia in August 1999 and September 2002 we collected some specimens clearly belonging to *Platycleis* Fieber, 1853 s.l., but clearly differing in morphology and sound from other species. This species is described here as *Platycleis galvagnii* **n. sp.**

### **Material and methods**

The collected specimens and related data are listed below. All the measurements were taken with a micrometric ocular on a stereomicroscope (Optech EMX-210-2).

Recordings were made with Tascam DA-P1 dat-recorder, with a Sennheiser microphone, module K6 with head ME40. The song files were sampled at 44.1 kHz and 16 bit and analysed with Bias Peak software. Also ultrasonic recordings were made through a batdetector (Petersson D240) with time expansion. This resulted in 8 bits 300kHz sampled fragments in the batdetector, played back with a 10 times lowered speed, with a frequency response of 1–12kHz (originally 10–120kHz).

The following abbreviations are used for the collections: MSNG: Museo civico di Storia Naturale G. Doria, Genoa, Italy; PFC: Paolo Fontana private collection, Isola Vicentina, Italy; FBC: Filippo Maria Buzzetti private collection, Arzignano, Italy; RKC: Roy M.J.C. Kleukers private collection, Leiden, The Netherlands.

***Platycleis (Platycleis) galvagnii* Fontana, Buzzetti, Kleukers & Odé n. sp.**

Figs 7–8, 13–36

**Examined material and type depository:** ♂ holotype: Italy, Sardinia, Nuoro district, Bruncu Spina, near the top, 1600 m, N 40°1'23"E 9°18'14", 6.VIII.1999, leg. P. Fontana and R. Kleukers (MSNG); Paratypes: same data as holotype (3♂♂ 1♀ PFC; 1♂ 1♀ FBC, 1♂ RKC); Italy, Sardinia, Nuoro district, Bruncu Spina, 1582 m, 10.IX.2002, leg. F. M. Buzzetti, G. Carotti, P. Fontana and P. Tirello (1♂ PFC; 1♀ RKC).

**Male description.** Ground colour (Fig. 13) light brown-grey with black markings over eyes extending from frons to fore margin of pronotum, lateral lobes of pronotum black with wide clear margin, bright white at hind margin; tegmina with typical *Platycleis* colour pattern; hind femora with small dark marking at the end of first basal third, right on lateral keel and lower half of outer surface darker (Figs. 13, 14, 15, 17). Abdomen clear brown, with two dorso-lateral blackish rounded spots on each tergite (Figs. 15–16). Head quite stout, eyes scarcely prominent (Figs. 19, 21). Fastigium as wide as the maximum eye diameter (Fig. 21). Pronotum (Figs. 19 and 21) with dorsal surface laterally compressed in the prozona, keeled on metazona; humeral sinus on hind margin of lateral lobes clearly detectable and placed almost at 3/4 of total pronotum length. Tegmina as long as wings, with almost parallel sides, in lateral view, with rounded apex ending a little before the tip of hind femur (Fig. 15). Pars stridens gently s-shaped, 1.40–1.41 mm long and with 53–54 pegs (Fig. 30). Tergite X (Fig. 23) widely concave in the middle forming a “V” incision on the hind margin and two pointed lateral processes directed backwards. Cerci (Figs. 25–26) digitiform, more or less cylindrical, evenly tapering to the rounded apex even after inner tooth. The inner tooth is situated slightly behind middle. Subgenital plate (Fig. 24) subtriangular with hind margin incised between styli and bearing two keels on posterior half in correspondence of styli. Titillators (Figs. 29, 32–35) symmetrical, thin and sharply curved (hooked) towards the apex, distal portion spinulated ventrally (Fig. 35). Male measures in Table 1. Stridulatory apparatus of ex. “2” and ex. “6”: stridulatory file length in mm: 1.40–1.41; number of pegs: 53–54; pegs x mm: 35.70–35.71.

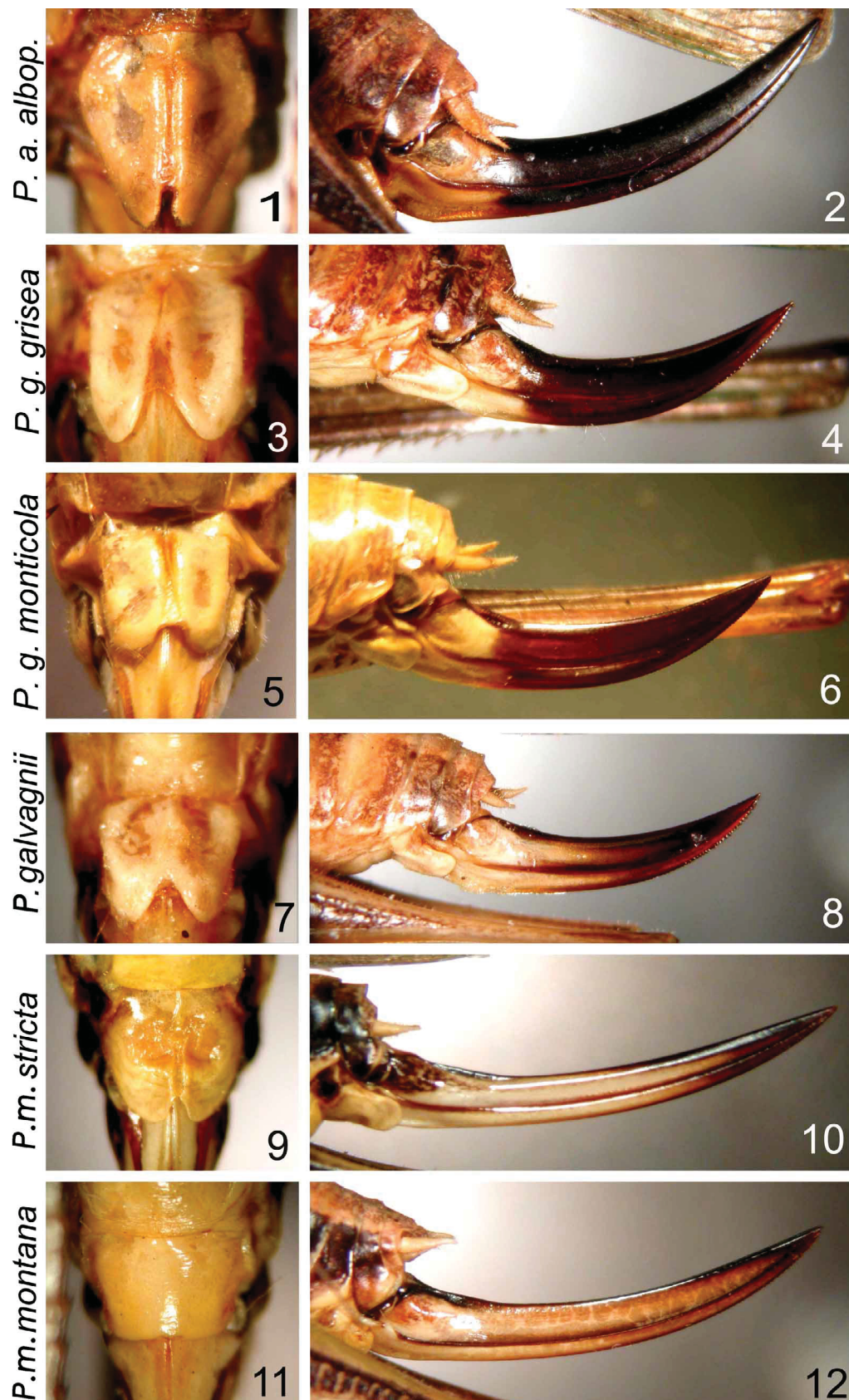
**TABLE 1.** Measurements in mm of *Platycleis galvagnii* n. sp. (holotype marked with asterisk).

Body length	Pronotum	tegmen	Hind femur	Male cercus	Ovipositor
16.2	3.8	15.7	13.1	1.6	-
16.3	3.9	17.1	13.2	1.5	-
13.8	3.5	14.9	13.4	1.4	-
15.8	3.8	15.7	13.5	1.4	-
15.5	3.8	15.2	14.1	1.4	-
16.4*	3.7*	16.1*	13.7*	1.6*	-
23.7	3.7	17.1	14.4	-	6.7
25.2	4.4	20.1	16.3	-	6.6
23.8	4.1	18.3	14.9	-	6.9
26.8	3.9	18.5	14.9	-	7.1

**Female description.** Colour pattern (Figs. 14, 20, 22) and structure of head, pronotum and tegmina (Figs. 17, 20, 22) as in the male. Tegmina reaching the tip of hind femurs (Fig. 17). Last abdominal sternite (Fig. 28) swollen on basal two thirds with fore margin rounded and hind margin straight. Subgenital plate (Fig. 28) subtrapezoidal with hind margin “V” incised forming two lateral lobes apically rounded. Ovipositor short and gently upcurved, light coloured on basal half and black in the distal half, with white and black colour extending into distal and basal half respectively; apex weakly crenulated on lower margin (Figs. 8, 17, 31). Female measures in table 1.

**Bioacoustics.** The calling song of *P. galvagnii* consists of an echeme, lasting 1–6 s, repeated more or less regularly with intervals of about 1–3 s (fig. 36). An echeme usually consists of a series of 4–8 microsyllables, followed by a series of 30–150 macrosyllables. Only very rarely echemes can be heard that consist of only microsyllables or echemes ending with microsyllables.

Microsyllables last only 1–3 ms and are repeated at the rate of about 25–32/s. Macrosyllables last about 60–75 s and are repeated at the rate of about 10–13/s. Oscillographic analysis shows that only an unidirectional (presumably closing) movement produces sound.

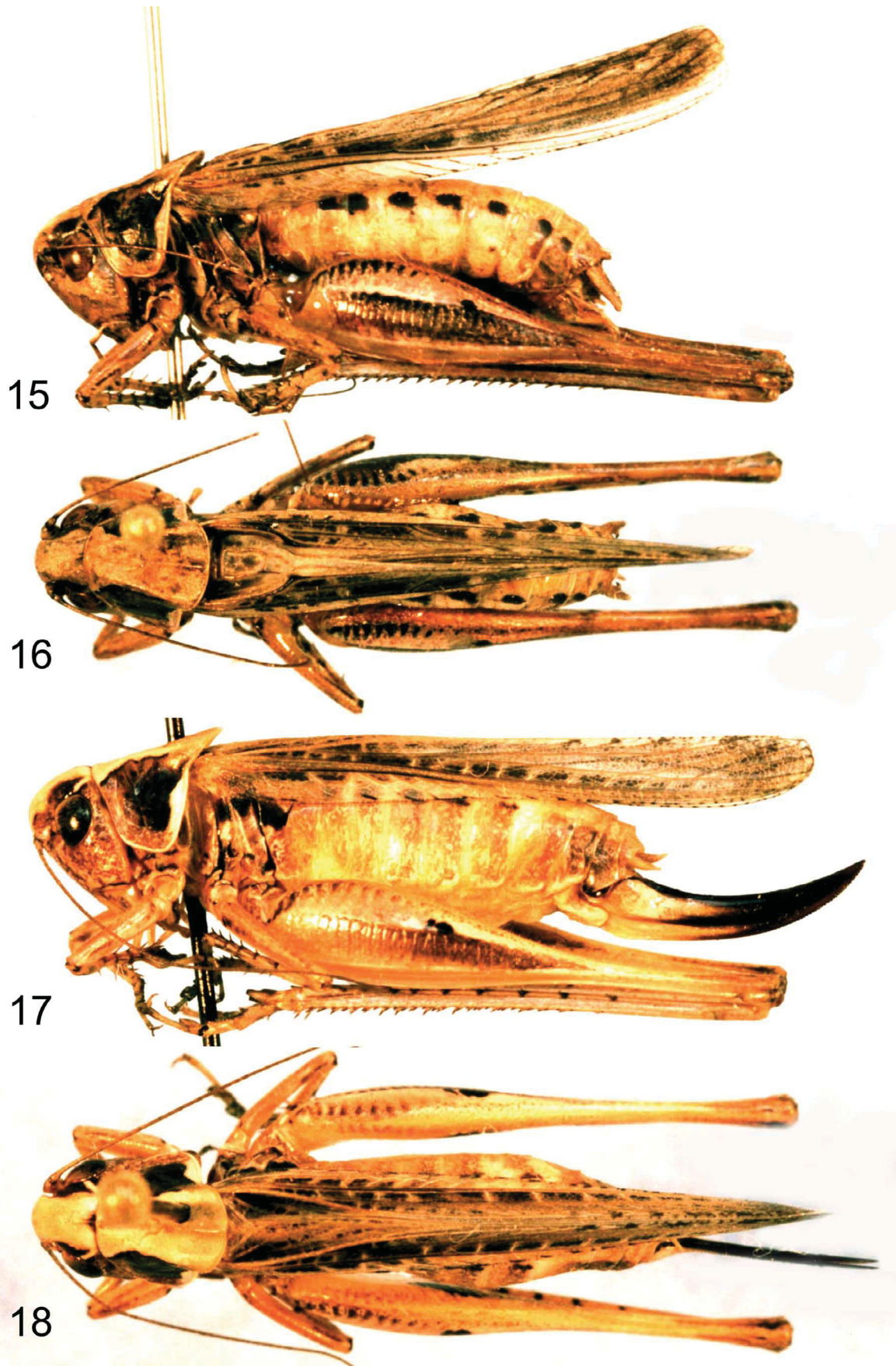


**FIGURES 1–12.** Dorsal view of the female subgenital plate and side view of the ovipositor of *Platycleis albopunctata* albopunctata (1–2), *Platycleis grisea grisea* (3–4), *Platycleis grisea monticola* (5–6), *Platycleis galvagnii* **n. sp.** (7–8), *P. (M.) stricta* (9–10) and *P. (M.) montana* (11–12).



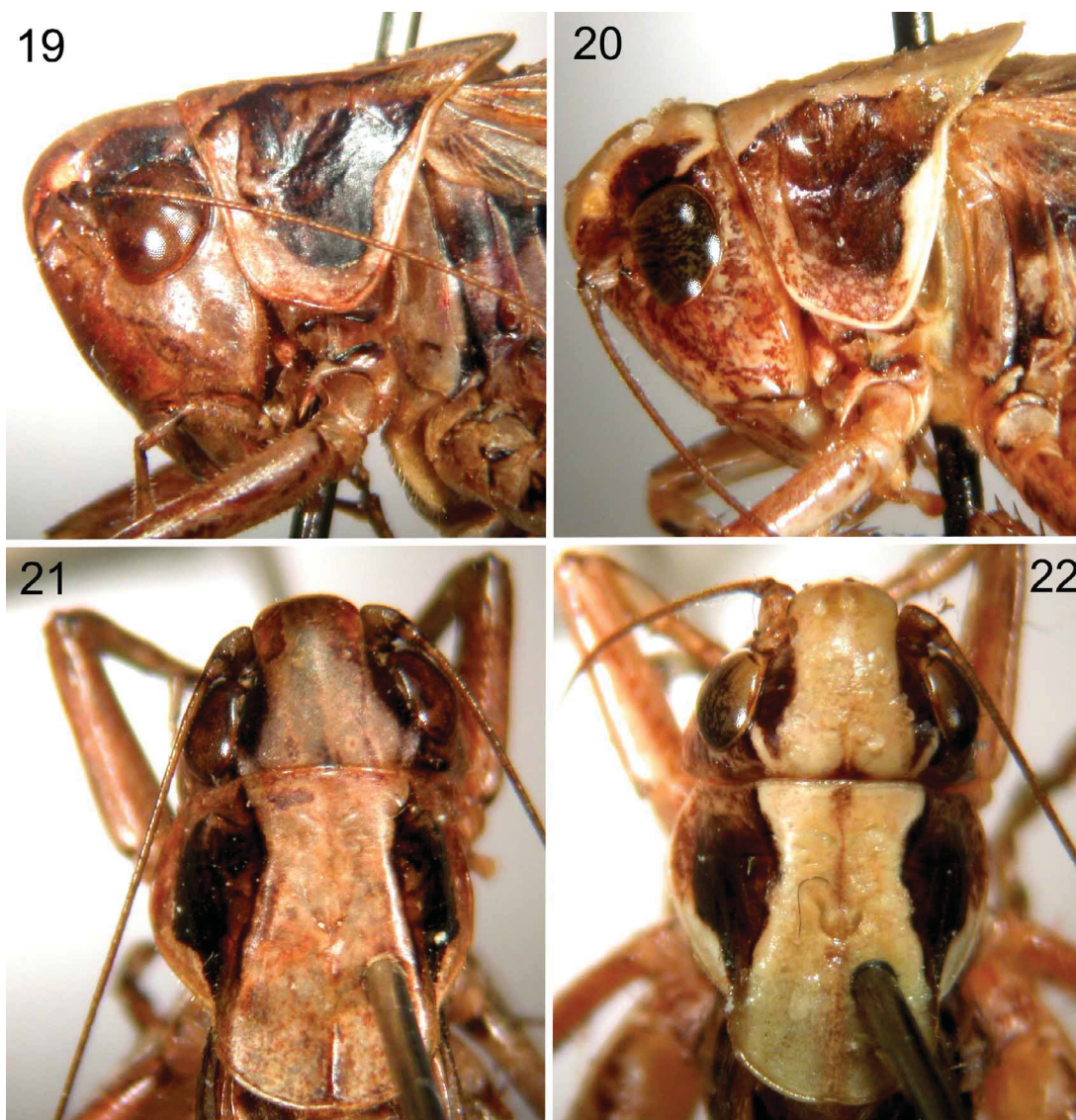


**FIGURES 13–14.** Alive specimens in nature of *Platycleis galvagnii* **n. sp.**, male (13) and female (14).



FIGURES 15–18. *Platycleis galvagnii* n. sp., in lateral and dorsal view. Male holotype (15–16) and female paratype (17–18).





**FIGURES 19–22.** *Platycleis galvagnii* n. sp., head and pronotum in dorsal and lateral view. Male holotype (19, 21) and female paratype (20, 22).

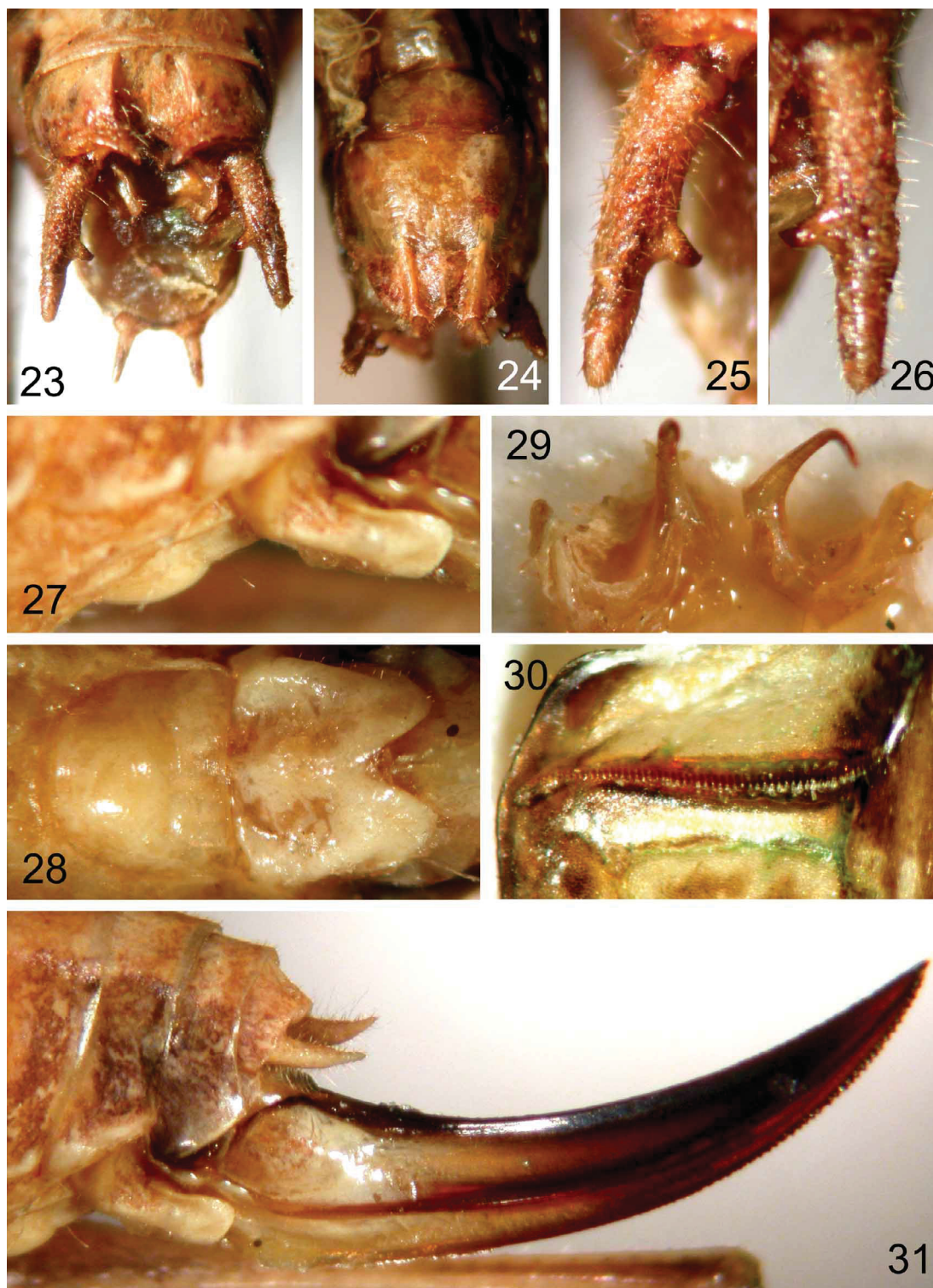
The frequency spectrum shows a maximum around 25 kHz in microsyllables and around 30 kHz in macrosyllables.

**Diagnosis.** *Platycleis galvagnii* is a small species clearly different from other *Platycleis* because of the following characters: the humeral excision of the pronotum is scarcely evident, more similar to that of subgenera *Tessellana* and *Montana*. The species of the subgenus *Platycleis* all show an evident shoulder excision. The female subgenital plate does not show a central furrow, typical of all the species of the subgenus *Platycleis*, but is more similar to *Montana* or some *Metrioptera* s.s.. The ovipositor looks like that of a *Montana* or *Metrioptera* s.s., which are whitish in the first half, but it is much more slender. The titillators are very characteristic, with the apical parts very hooked, different from all the known *Platycleis* s.s. The most similar titillators seem those of *P. grisea*, but these are longer and not as hooked as in *P. galvagnii*. The Corsican subspecies *P. grisea monticola* Chopard, 1923 is also small and with tegmina not exceeding the apex of the femur, but the humeral excision, subgenital plate and shape and colour of the ovipositor lie within the range of the typical *Platycleis* s.s. Furthermore this species is clearly bigger than the Sardinian taxon.

Bioacoustically, several species of *Platycleis*/*Montana* share the character of singing with echemes that include macro- and microsyllables (e.g. *P. affinis*, *P. romana*, *P. iberica*, *P. falx* and *P. (M.) stricta*). The repetition rate of macrosyllables of *P. galvagnii* n. sp. falls within the range of those of *P. affinis* and *P. falx*. Yet, none of those species start their echemes with a series of microsyllables.

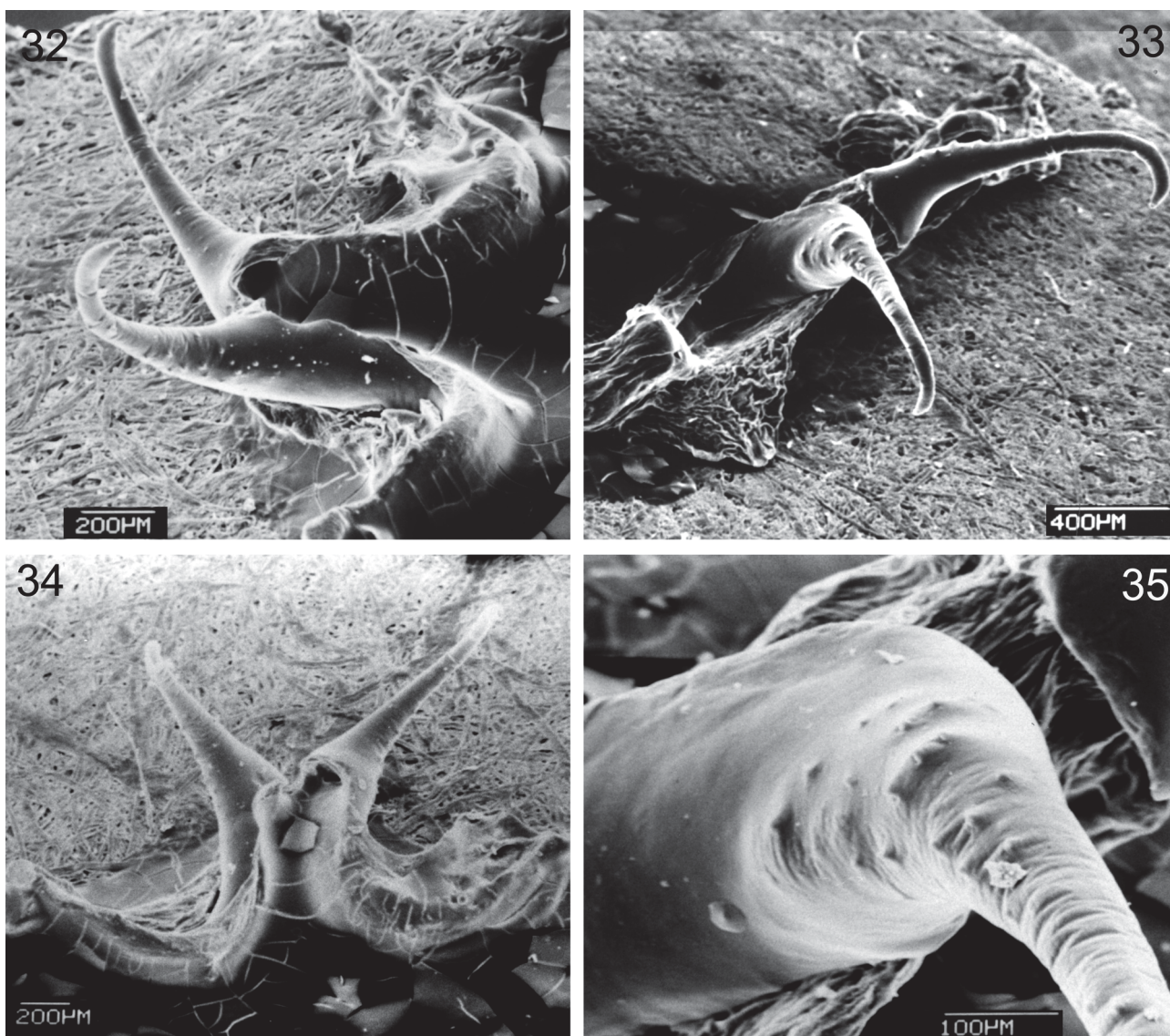
**Habitat.** *Platycleis galvagnii* n. sp. lives in very dry stony habitat on top of Bruncu Spina in Gennargentu mountain (Fig. 37). It lives within grasses or shrubs. In the same locality and habitat we collected: *Platycleis* (*T.*) *tessellata* (Charpentier, 1825), *Rhacocleis baccettii* Galvagni, 1976, *Euchorthippus sardous* Nadig in Nadig & Nadig, 1933 and *Calliptamus italicus italicus* (Linnaeus, 1758).

**Etymology.** We are happy and honoured to name this new species after the Italian expert orthopterologist and our mentor Antonio Galvagni (Rovereto, Italy), who intensively studied the Sardinian Orthoptera fauna.



**FIGURES 23–31.** *Platycleis galvagnii* n. sp. Male apex of abdomen in dorsal view (23), male subgenital plate in ventral view (24), male left cercus in dorsal view (25), male left cercus in ventral view (26), female last abdominal tergite and subgenital plate in lateral view (27), female last abdominal tergite and subgenital plate in ventral view (28), male titillators (29), male pars stridens (30) and female ovipositor in lateral view (31).





**FIGURES 32–35.** *Platycleis galvagnii* n. sp. SEM photos of male titillators. Dorsal left lateral view (32), posterior view (33), ventral view (34) and detail of basal portion in ventral view (35).

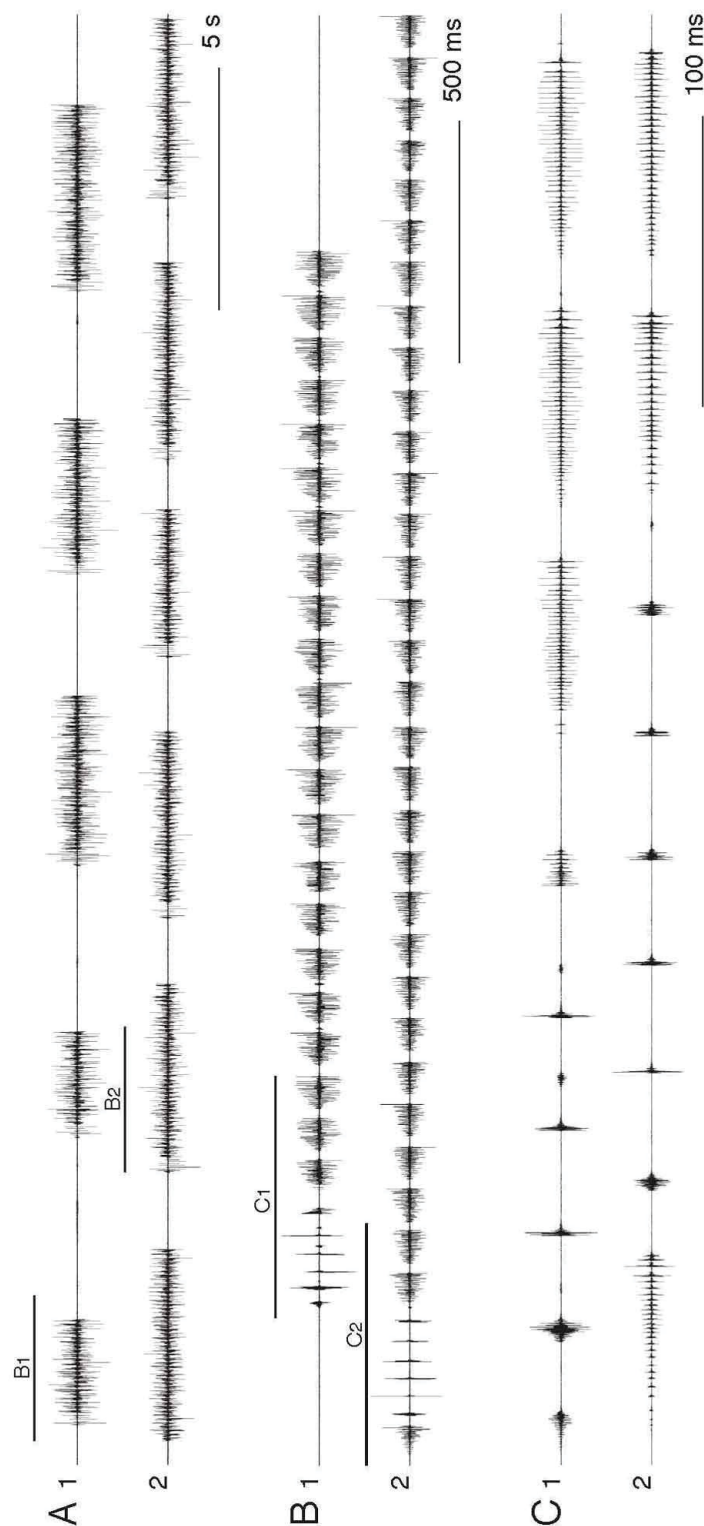
## Discussion

The classification of the genus *Platycleis* s.l. has been subject to much discussion over the years. The groups which can be distinguished within this genus are mostly treated as subgenera. Zeuner (1941) described and raised 13 groups to the genus level. Ragge (1990) summarized the situation as being still unclear. He argued that for the moment a classification within only one genus (*Platycleis*) was most sensible. At this moment this view is still mostly accepted (e.g. Orthoptera Species File, Fauna Europaea), although for example *Decorana*, *Sepiana* and *Montana* are sometimes treated as genera.

We tentatively place this new taxon in *Platycleis* s.s., although some characters do not really fit. A revision of supraspecific taxa belonging to *Platycleis*/*Metrioptera* is in preparation (Massa & Fontana), and the placement of this new taxon will be taken into account.

Bruncu Spina is a classical entomological locality, well known by entomologists and naturalists and easily accessible by car. It therefore seems strange that this species has not been found before. It might be that the specimens have been misidentified as *Platycleis* (*T.*) *tessellata*. This species is also very small and, superficially viewed, the colour pattern is similar. We have looked for the species in other parts of Sardinia, but to no avail. The known distribution of *P. galvagnii* n. sp. therefore appears to be restricted to Bruncu Spina, in the Gennargentu massif.





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**FIGURE 36.** Oscillograms of *Platycleis galvagnii* n. sp., A: 30s, B: 3s, C: 500ms. Two recorded specimens. 1: Bruncu Spina, Sardinia, 30.VII.1999, specimen AO, rec. 4.VIII.1999, 26 °C (recording BO112: 11); 2: Bruncu Spina, Sardinia, 30.VII.1999, specimen BO, rec. 5.VIII.1999, 30 °C (recording BO114: 3).



**FIGURE 37.** Habitat of *Platycleis galvagnii* n. sp., Sardinia, Nuoro province, Gennargentu mountains, Bruncu Spina, near the top 1600 m, 30.VII.1999.

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